



PHENIX EM-Cal PbSC OPERATIONS IN THE PEH

procedure name

PHENIX Procedure No. PP-2.5.2.9-07

Revision: B

Date: 5-3-00

Hand Processed Changes

<u>HPC No.</u>	<u>Date</u>	<u>Page Nos.</u>	<u>Initials</u>
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____

Approvals

_____ PHENIX S E & I	_____ Date	_____ Cognizant Scientist/Engineer /Activity Manager	_____ Date
_____ PHENIX Safety	_____ Date	_____ CA-D ES&H/ SAFETY	_____ Date
_____		_____	

PbSc EMCal in the PEH for Physics Run (PR)-2000

1. Purpose

The purpose of this document is to define the modes of operation of the PHENIX PbSc EMCal subsystem in the PEH (PHENIX Experimental Hall) before and during the Physics Run 2000. Following the rules in this document will ensure:

- A. the safety of all personnel from risks associated with the operation of the high voltage systems required to power the photomultiplier tubes inside the PbSc EMCal supermodules of the sectors W0, W1 and E2,
- B. the implementation of the appropriate emergency approaches,
- C. prompt notification of the appropriate RHIC and S&EP specialists,
- D. the maintenance of appropriate RHIC emergency status,
- E. the preservation and protection of the environment, and
- F. the preservation of BNL facilities and equipment.

2. Responsibilities

During the PR, there will be two levels of responsibility for the oversight of the PbSc EMCal subsystem.

The first level of responsibility will be the PHENIX Shift Crew.

Prior to data taking, there will be a period of calorimeter commissioning when calorimeter is tested at high voltage before the IR is closed and the calorimeter is inaccessible. During this commissioning phase the calorimeter HV&LV systems will be monitored by the team of calorimeter experts. A record of the performance of the PbSc EmCal system will be kept by the experts.

During data taking, it will be the responsibility of the PHENIX shift crew to:

- 2.1 Monitor the status and alarms for the EMCal HV & LV system according to a prescribed check off list at least once a shift (eight hours).
- 2.2 In the event of an alarm or irregularity, contact an expert from the Expert Call List given in the appendix.

The second level of responsibility is the calorimeter experts. It is the responsibility of the calorimeter experts to:

- 2.3 Maintain the PbSc Calorimeter subsystem in a safe operating condition. This includes:
 - 2.3.1 setting, adjusting, and checking the LV power supplies,
 - 2.3.2 setting, adjusting, and checking the Laser intensity ,
 - 2.3.3 setting, adjusting, and checking the HV for all bases of the sectors W0, W1 and E2.
 - 2.3.4 posting any special instructions or notifications as required, and carrying out any emergency actions, as prescribed in the Procedures section of this document.

3. Prerequisites

The calorimeter experts shall have read or have training in the following areas:

- 3.1 PHENIX specific fall protection document,
- 3.2 PHENIX Access Awareness document,
- 3.3 PHENIX Skill of Craft document,

- 3.4 Emergency procedures for the PHENIX experiment (AD-3.16),
- 3.5 BNL Electrical Safety I (HP-OSH-150B),
- 3.6 BNL Lock Out/Tag Out Training (OSH151B, OSH151C),
- 3.7 PHENIX PbSc EmCal Laser Awareness Training,
- 3.8 geographical layout of the experimental area (routes of egress, location of emergency equipment, phones and controls)

The calorimeter experts shall train all personnel involved in the PbSc EMCal running in the safe operation of the PbSc EMCal HV&LV system.

4. Precautions

The safety of personnel is of primary importance. The calorimeter experts and shift crew members shall take great care to ensure that the EMCal subsystem will be operated in a way that does not place personnel at risk of physical harm.

4.1 HV system precautions:

The HV power supplies are current limited at less than 12 milliampere per channel. All HV points are enclosed within the sector electronics enclosure in order to eliminate the danger to personnel. When the doors to the enclosures are closed the HV points are inaccessible to personnel. Switching the HV on with enclosure doors opened is prevented by opened magnetic end-switched interlocks, that are directly wired to the HV crate interlock system.

As a consequence – the HV system will not operate with any of the eight enclosure doors open.

4.2 LV system precautions:

The PbSc EMCal uses one type of low voltage power supplies (+/- 6V), which is required for the operation of the FEM crates. This power is delivered from the LV power supply rack to the detector and distributed among the crates via fuse-protected terminal blocks installed on DIN-rails inside of the sector enclosures. Because the voltages are low, these LV wires may stay energized while the doors are open to allow test-work on the FEM crates.

5. Standard Operating Procedures

5.1 HV System Procedures: In normal operations the experimental hall will be closed to personnel, making access to any HV point impossible. Under such conditions, follow this procedure for turning on the HV:

- 5.1.1 Make sure that the Phenix "Check off list for IR closing", PP-2.5.3.14-09 was followed.
- 5.1.2 Check that the appropriate current limits are in place for the power supply. Each subsystem shall maintain a HV logbook, where the operation parameters of the HV settings are recorded. This shall include the current limits, target voltages, ramp rates, operating voltages and currents and trip tolerances.
- 5.1.3 Check that the target voltage for each HV output line is appropriate (<2000 Volts). The first stage of bringing on the HV shall be a single increment in the ramp up. This is done because the current trips are disabled during ramping, and in order to locate a short in the system, it is necessary to halt the ramping and check the currents at the earliest possible stage.
- 5.1.4 Check that the ramp up rate for each HV supply is appropriate (<400 Volts per step).
- 5.1.5 Begin ramping up the HV.

- 5.1.6 If any of the HV supplies trips, disable the responsible channel until the reason for the tripping is understood.
 - 5.1.7 If there are no more HV trips, verify that the operating currents are appropriate.
 - 5.1.8 Change the target voltage to the correct operating voltage for each channel, as given in the operating log for each HV channel.
 - 5.1.9 Continue ramping up the HV.
 - 5.1.10 When ramping is complete, verify that the operating currents are appropriate, as given in the operating log for each channel.
 - 5.1.11 The HV is ready for PbSc operation.
- 5.2 HV System Procedures, Turning off the PbSc HV:
- 5.2.1 Begin ramping down the HV.
 - 5.2.2 After the ramping down is finished, verify that the HV is off by the read back.
- 5.3 **Normal Operations LV System Procedures Mode:** This is the standard mode for turning the PbSc LV system on and off.
- 5.3.1 Make sure that the Phenix "Check off list for IR closing", PP-2.5.3.14-09 was followed.
 - 5.3.2 Turn on the LV power supplies by LV Control Screen in the Counting House. Wait for 20 sec and that the control light turned red.
 - 5.3.3 For turning off the LV: Turn on the LV power supplies by LV Control Screen in the Counting House. Wait for 20 sec and that the control light turned green.

6. HV lock out procedure during maintenance

- 6.1 Since the HV is included in the sector door interlock system (see 4.1) no special lock out procedure is mandatory to avoid working while the HV is on.

7. Documentation

- 7.1 None.

8. References

- 8.1 C-A Department OPM 3.0, "Local Emergency Plan for the C-A Department."
- 8.2 BNL Environment, Safety & Health Standard, (<http://sbms.bnl.gov/ld/ld08/ld08t011.htm>).
- 8.3 Phenix "Check off list for IR closing", PP-2.5.3.14-09

Appendix

1. Call list for the PbSc EMCAL subsystem experts.
- 1.1

Sebastian White

x5488

1.2

Edouard Kistenev

x7502

1.3

Craig Woody

x2752

1.4

Sergei Belikov

x

1.5

Evgeniy Melnikov

x
2. Schematic of the PbGI EMCAL HV/LV power supply system.

